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CONTENTS

A Study of Student Teachers' Attitudes Toward Children 193
MERRITT C. OELKE

A Study of Student Withdrawal at "W. U." 199
EMMA W. BRAGG

An Objective Measurement of a Teacher's Classroom Interactions .. 203
JOHN WITHALL

A Reading-Center Approach Within the Classroom 213
JOSEPH JACKSON

Directed Versus Independent Discovery of Established Relations ... 223
ROBERT C. CRAIG

Effects of Non-promotion on Educational Achievement in the Elementary School 235
WILLIAM H. COFFIELD AND PAUL BLOMMERS

Book Reviews 251

Publications Received 254

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(Continued on Inside Back Cover)

THE JOURNAL OF

EDUCATIONAL PSYCHOLOGY

Volume 47 April, 1956 Number 4

A STUDY OF STUDENT TEACHERS' ATTITUDES TOWARD CHILDREN[1]

MERRITT C. OELKE

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This study was a preliminary exploration of the nature of some of the changes in student teachers' attitudes toward children during initial teaching experiences and was designed to locate promising areas for further study.

The Minnesota Teacher Attitude Inventory (*1*) and a modification of the Alexander Thematic Apperception Test for Teachers (*2*) were used as stimuli to elicit expressions of attitudes. The former is a conventional inventory designed to measure teachers' attitudes toward children, while the latter consists of eight pictures which may be interpreted by the subjects as containing situations involving children.

The modifications of the Thematic Apperception Test for Teachers in this study consisted of the usual T.A.T instructions for five pictures used previously by Ohlsen and Schultz (*3*), plus the use of a series of questions based on kinds of responses which those investigators found discriminated between best and poorest student teachers. The questions were designed to keep structuring minimized.

A total quantitative score using expressed acceptances and rejections of children's behavior was developed, so that data could be analyzed statistically by means of simple analysis of variance, chi-square, and the "*t*" test.

No extensions of this research to other groups were intended since the responses were both the criterion and the test. No generalizations of the behaviors of other groups nor extension of these re-

[1] This report is based on a part of a Doctor of Education thesis at the University of Illinois. Dr. Merle M. Ohlsen was the adviser.

sponses to infer performance with children should be made without further specific validation.

The professional semester at a large midwestern university furnished the necessary and desirable experimental conditions for measuring the changes studied. In this program the student teachers were on campus the first six and the last four weeks of the semester, while the middle six-week period was spent away from campus teaching in a community.

A group of forty-four senior student teachers and a group of fifty junior students in education were used in a test-retest procedure. The seniors were members of two educational psychology classes in the professional semester. Since most common teaching fields were represented and since the only basis for enrolling in a particular section was that of scheduling conflicts, random assignment was assumed. The juniors were students in a course in principles of secondary education and did not differ from the seniors in areas essential to this study.

The two tests were administered to the teaching group on successive days during the week prior to the beginning of student teaching and again seven weeks later during the first week following student teaching. The T.A.T was administered to the junior pre-teaching group twice with exactly seven weeks between administrations. The M.T.A.I was not used for this group.

Correlations between T.A.T testings were 0.62 for the pre-teaching group and 0.55 for the teaching group. While no statistically significant differences were found between the two groups on the testings as far as total score was concerned, significant differences in amount of change were located in some areas.

A change significant at the one per cent level was found for the pre-teaching group in the direction of greater expressed acceptance of dependency upon adults and nonachievement as normal behaviors of children. This may be a result of the kind of course work these subjects were doing since the course in principles of secondary education at this university tended to emphasize the rôles of the teacher and student and to develop a greater understanding of the difficulties of a child. On the other hand, the teaching group showed less tendency to select the child as the most liked person after student teaching. Significance was at the five per cent level. This apparent contradiction may be accounted for by considering acceptance and liking as somewhat different functions.

TABLE I.—SUMMARY OF CHI-SQUARE TESTS OF SIGNIFICANCE OF CHANGE IN SCORING AREAS

Scoring Area	Pre-teaching Group	Teaching Group
Pleasure	2.5491	0.0043
Sexuality	0.4726	0.0054
Aggression	0.0644	0.3797
Dependency	6.8727*	0.0254
Nonachievement	12.4500*	0.5640
Affection	0.5963	0.0296
Curiosity	a†	a†
Interpersonal	1.7545	1.5359
Empathy	0.7364	4.5630‡
Democratic	0.0180	0.0316
Optimistic	0.2104	12.6577*

* Significant at 0.01 level, $df = 1$.
† Expected frequencies less than five.
‡ Significant at 0.05 level, $df = 1$.

The teaching group produced more optimistic outcomes in their protocols after student teaching than before, with the change significant at the one per cent level.

Neither of the instruments used in this study demonstrated any statistically significant differences which could have been attributed to teaching field, age, sex, school where student teaching was done, previous informal teaching experience, degree of control by coöperating teacher, student teachers' perception of difficulty, number of teachers in the family, number of siblings, or membership in a particular section of educational psychology. In about half of the analyses, the within groups variance was greater than the between groups variance so that F was not computed. In the balance, the F had a probability far greater than the five per cent level.

There was a suggestion in the data that in home economics and social studies, student teachers may be more acceptant of children than in other fields although this is only indicated. This should be investigated further since these two groups were the only ones in the study which had a planned program of pre-student teaching experiences. Another suggestion which may warrant further investigation is based on the student teachers' perception of difficulty. Those who felt they had no difficulty in teaching tended to increase slightly in acceptance; those who felt a little difficulty had no score change; and those who felt they had great difficulty tended to de-

crease in acceptance of children. Neither of these suggestions is based on statistical data but both seem to warrant further investigation.

Some question might be raised concerning the representativeness of the norm group for the Minnesota Teacher Attitude Inventory since the original norms were based on University of Minnesota students and the academic group in the present study obtained scores significantly different (five per cent level) from the mean of the norms. Test-retest product moment correlation was 0.88 for the present group. This coefficient was as high or higher than correlations reported by the authors for various time intervals.

There seems to be little relationship between the T.A.T and M.T.A.I measured, since the product moment correlations were −0.17 on the pre-test, +0.24 on the post-test, and +0.15 on score change.

Since mean scores may tend to conceal significant information, a study was made of the scores of the fifteen per cent best student teachers and the fifteen per cent poorest student teachers as selected by their supervisors (*4*). The numbers were necessarily very small and results should be considered only as indications which point the way for further study.

The Minnesota Teacher Attitude Inventory did not show any statistically significant differences between the two groups.

The T.A.T seemed to be of value primarily in terms of change recorded for these groups since amount and direction of score change differed to a degree which was significant at the five per cent level. Table III indicates the difference in direction of change with the

TABLE II.—COMPARISON OF MEAN MTAI SCORES OF STUDY GROUP AND STANDARDIZATION GROUP

Group	*N*	Mean	S.D
Academic subjects:			
Standardization	237	67.8	24.3
Study pre-test	22	55.4*	21.0*
Study post-test	22	54.8*	29.5*
Nonacademic subjects:			
Standardization	238	63.3	25.4
Study pre-test	22	60.3	18.8
Study post-test	22	62.4	28.9

* $P < 0.05$.

TABLE III.—RAW SCORE CHANGE SUMMARY ON TAT AND MTAI BEST AND POOREST STUDENT TEACHERS

Test	Group	*N*	Mean	Range	*F*	Probability
TAT	Best	6	+9.3	−2 to +29	6.76	$P < 0.05$
	Poorest	7	−6.9	−25 to +5		
MTAI	Best	6	+1.5	−11 to +16	*F* not computed*	
	Poorest	7	−0.7	−15 to +13		

* Within groups variance greater than between groups variance.

positive score demonstrating an increased acceptance as measured on this instrument. It is perhaps significant that the only increase in score in the poorest group was registered by a subject who was placed there because of difficulties in relations with the coöperating teacher rather than because of difficulties with students.

While it was impractical to compute statistical significance, a pattern analysis of the T.A.T scoring indicated that the best group seemed to be more accepting of pleasure, aggression, and affection as normal behaviors of children and seemed to express a greater liking for children and a greater desire for interpersonal relations with children. Further investigation seems warranted by these differences.

The following conclusions seem sufficiently clear to warrant further study:

(1) Significant differences were found between teaching and pre-teaching groups in expressed acceptance of aggression, in selection of a child as most liked, and in optimism. The teaching group was more accepting and more optimistic.

(2) The T.A.T discriminated in amount and direction of change between the small number of best and poorest student teachers while the Minnesota Teacher Attitude Inventory did not.

(3) Student teachers rated as best expressed greater acceptance of children's behaviors after student teaching. Those rated as poorest tended to become less acceptant of children's behaviors after teaching.

(4) The Minnesota Teacher Attitude Inventory and the Thematic Apperception Test for Teachers as modified for this study measured different characteristics of the student teachers.

(5) Neither instrument used showed differences on the pre-test sufficiently significant to warrant use of the tests as predictive in-

struments at this stage of development. This is particularly true when used on a one-administration basis.

(6) The norm groups of the Minnesota Teacher Attitude Inventory as used in this study should be examined for representativeness.

(7) Planned pre-student teaching experiences should be studied further to determine if there is a definite relationship between these experiences and the kind of relationships established with students while teaching.

Finally, these and so many other questions were raised by this study that there is ample reason to believe that a thorough study of student teacher attitudes will be most productive for future research.

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3) Merle M. Ohlsen and Raymond E. Schultz, "Projective Test Response Patterns for Best and Poorest Student Teachers," *Educational and Psychological Measurement*, Vol. 15, No. 1: 18–27.

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A STUDY OF STUDENT WITHDRAWAL AT "W. U."[1]

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STATEMENT OF PROBLEM

The problem of the study consists of testing the null hypothesis that there are no statistically significant differences in the performance of those students who withdrew and those who continued on certain selected criteria considered related to withdrawal. The criteria chosen against which the two groups of students are compared are: High School Average; Age; Performance on the American Council on Education Psychological Examination (Q, L and T Scores, 1948 College Edition); Coöperative English Test, C_2, Comprehension, Higher Level; Academic Average made at "W. U." during the first semester of 1952–53; Sex, and Curriculum.

SELECTION OF SAMPLE

The defined population is the freshman day class that entered in the fall of 1952. This class contained seven hundred and twenty-four students; three hundred and five or 42.13 per cent continued and four hundred and nineteen or 57.87 per cent withdrew during the two-year period from September 1952 through May 1954. Random samples of 100 cases were taken, with the use of the table of random numbers from each of the two groups of students.

DESIGN AND STATISTICS

The statistical design is that of the comparison of unmatched groups. The statistical technique of Critical Ratio was used to test the differences in mean performance between the "continued" and "withdrawn" groups except for the entrance test data which were tested for differences in per cent scoring above the selected percentiles of twenty, fifty, and seventy-five (national norms used). Chi-square was used to determine if there were any statistically sig-

[1] "W. U." is a midwestern city college with a student population of two thousand, nine hundred and nineteen; coeducational; inter-racial; schools of arts and sciences; education; fine arts; business administration; graduate.

TABLE I.—COMPARISON OF THE TWO GROUPS ON SELECTED CRITERIA OF WITHDRAWAL

Criterion	"Continued" Group	"Withdrawn" Group	Diff.	*S.E.* Diff.	C.R.	*P*
1. High school average	87.59	85.05	2.54	0.591	4.30	<0.003
2. Mean age	18.73	19.12	0.39	0.361	1.08	0.29
3. Entrance test scores (per cent scoring above)						
A. A.C.E.						
1) "L" 20%ile*	80.00	62.00	18	6.30	2.86	0.004
2) "L" 50%ile	42.00	34.00	8	6.80	1.18	0.25
3) "L" 75%ile	20.00	18.00	2	5.54	0.36	0.73
4) "Q" 20%ile	80.00	75.00	5	5.89	0.85	0.40
5) "Q" 50%ile	58.00	47.00	11	7.02	1.57	0.12
6) "Q" 75%ile	35.00	23.00	12	6.36	1.89	0.06
7) "Total" 20%ile	77.00	63.00	14	6.40	2.19	0.03
8) "Total" 50%ile	51.00	34.00	17	6.88	2.47	0.01
9) "Total" 75%ile	26.00	22.00	4	6.03	0.66	0.52
B. Coöperative English test						
1) "Total" 20%ile	73.00	56.00	17	6.65	2.56	0.01
2) "Total" 50%ile	39.00	20.00	19	6.31	3.01	0.003
3) "Total" 75%ile	20.00	13.00	7	5.23	1.34	0.19
4. Mean grade†	1.45	0.62	0.83	0.12	6.80	<0.003

* %ile = percentile.

† $C = 1$; $D = 0$.

TABLE II.—RELATIONSHIP BETWEEN CONTINUATION: SEX AND CURRICULUM

Criterion	Chi-square	Degrees of Freedom	*P*
5. Sex	1.13	1	0.30
6. Curriculum	13.80	5	>0.02

nificant relationship between sex and continuation and curriculum and continuation.

FINDINGS

See Tables I and II.

SUMMARY OF FINDINGS AND GUIDANCE IMPLICATIONS

(1) There is a statistically significant difference in the performance of the "continued" and "withdrawn" groups on the criterion of high school average, according to Table I. For counseling, the finding may mean that academic counseling should be provided those whose high school average falls much below the mean performance of the "continued" group. Also, the finding may mean that an attempt should be made to select for admission those applicants whose high school average does not fall much below the average of the "continued" group.

(2) There is no statistically significant relationship between age and continuation at "W. U." However, those in the "withdrawn group" have a higher mean age and a wider range than the "continued" group (see Table I). For counseling, the implications may be that the older students may need more individual attention than the younger students.

(3) The entrance test data reveal that at "W. U.," emphasis is placed on the linguistic and reading abilities to the neglect of the quantitative ability. The implications may point toward the need for more emphasis on remedial and developmental reading programs. The following are summarizing statements afforded by the entrance test data (see Table I):

   (a) The "Q" section of the A.C.E. test does not discriminate between those who continued and those who withdrew.

(b) The "L" section of the A.C.E. test discriminates between the two groups at the twenty percentile but not at the fifty and seventy-five percentiles. Probably those who compared unfavorably on the "L" (linguistic) section withdrew.

(c) The "Q" (quantitative) score tends toward statistical significance at the seventy-five percentile but at the twenty and fifty percentiles the "Q" score does not discriminate. It may be that the "Q" section of the test is too easy at the twenty and fifty percentiles as evidenced by the large percentage scoring above these levels (see Table I) and/or that the quantitative ability is not sampled at "W. U." during the first four semesters.

(d) The Coöperative English Test total scores discriminate between those who continued and those who withdrew at the twenty and the fifty percentiles but not at the seventy-five percentile. This finding is the same as for the A.C.E. total score. It may be that those who compared unfavorably withdrew so that at the seventy-five percentile, the two groups left were homogeneous.

(4) There is a statistically significant difference in the performance of the "continued" and "withdrawn" groups on the criterion of grade point average made during the first semester at "W. U.," with the "continued" group making the the higher grade point average (see Table I). Withdrawal may be a question of lack of motivation as a result of poor grades or it may be a question of continuation drawing heavily on the reading and verbal abilities.

(5) There is no statistically significant relationship between sex and continuance at "W. U." (see Table II).

(6) There is a statistically significant relationship between curriculum at "W. U." (see Table II). The implications may be that more academic counseling should be provided in the selection of the curriculum, based upon a matching of skills, abilities, interests, and aptitudes required by the particular curriculum.

AN OBJECTIVE MEASUREMENT OF A TEACHER'S CLASSROOM INTERACTIONS

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National Education Association

It is generally agreed that, after the home, one of the major instruments for socializing individuals in terms of our cultural values and mores is the school. It has also been pretty well determined that this induction into the customs of our society will be carried on in a group situation of twenty-five or more pupils guided by an adult, considered to be a representative of our values, who will oversee and aid the youngsters' learning and growth. We seem committed both from a social, psychological, and economic viewpoint to this method of inculcating in young people the ideas and ideals we have developed over the years. In view of this fact and in view of the "group-guided-by-a-teacher" learning situation which is normal and accepted in our educational system, it seems important to examine the way in which the teacher fulfills his function in the classroom particularly with respect to his distribution of interactions with the individual learners. This we have attempted to do with a regular teacher of an art class.

DISTRIBUTION OF A TEACHER'S TIME AMONG PUPILS

No one would be naïve enough to suggest that a teacher's time should be divided *equally* among the pupils in his class. That would be a negation of our modern view of the peculiar needs of each learner for help, guidance, and support from the teacher. However, an assumption is made in this study that a teacher interested in the maximal growth and development of each pupil will accord each youngster as much time as is needed to render help and guidance effectively. This help and guidance will be provided primarily by face-to-face interactions, the number of which will be governed by the known facts about the needs of pupils that have been gleaned from the teacher's own observations and from tests and school records. To the writer this means that if a given teacher consistently affords few or no face-to-face contacts with a particular

learner, one may legitimately raise the question as to whether in the light of the known facts the teacher is adequately fulfilling his rôle vis-a-vis that pupil. In order to ascertain the pattern of distribution of face-to-face contacts between pupils and teacher, a variation of the Olson time-sampling technique was used. An analysis was made of the photographically recorded contacts of a teacher with his pupils in a normal classroom situation by means of an automatic time-lapse camera. The class was a regular art class. The pupils met daily on a customary schedule for twelve weeks with their regular art teacher. The situation was not experimentally manipulated in any way.

The questions to which answers were sought were the following: How is the teacher's time distributed among the learners? To what extent does the amount of time given to individuals differ? Is the distribution of time consonant with the presumed needs of the pupils? What are the implications for teachers?

HOW THE DATA WERE COLLECTED

For twelve weeks the regular class sessions of an eighth-grade art class in the Laboratory School of the University of Chicago were observed and analyzed. The class sessions were held in the laboratory classroom of the Department of Education of the University of Chicago. The class comprised twenty-six eighth-graders. The pupils worked around four large tables in the art class. They were not assigned specific chairs but moved freely about the room. The teacher went from table to table as he saw fit or was called on. On rare occasions the twenty-six individuals were convened as a whole group by the teacher for special announcements or infrequent class discussions. Each class session was recorded on the sound tape of a Recordgraph, and time-lapse photographs were taken automatically at fifteen-second intervals. As a result it was possible to synchronize the sound with the shots taken at fifteen-second intervals and get a fairly complete view of the interactions and groupings in the classroom.

THE TEACHER AND HIS PHILOSOPHY

The teacher of the class was a friendly, outgoing individual who achieved considerable rapport with his classes. He was considered a "good sport" and was accepted both in and out of class by pupils and colleagues as a "good egg." The educational philosophy of the

teacher is such that his major emphasis is on understanding the learner and trying, insofar as possible, to utilize his skills to meet the needs and harness the basic motivations of the learners. He was not the type of teacher to play favorites in a class but, rather, accepted each individual on his merits and geared his efforts to helping each pupil achieve as full a mastery as feasible of the ideas and skills related to the subject matter.

When the researcher asked the teacher to outline some of the criteria that guided his class activities, he stated that he: (1) was concerned with the development of each pupil's personality; (2) sought to maintain and enhance good pupil-teacher relationships as a means of facilitating learning; (3) was anxious to encourage individual creativity and experimentation; (4) sought to help the pupils identify their own goals and choose their own activities; (5) sought to have the pupils develop some ability in self-evaluation.

It would seem reasonable to expect that the teacher of this art class, activated by such values, would be quite sensitive to each pupil's interests and needs, and that his contacts would be distributed among them on the basis of his appreciation of each learner's special needs and requirements. The evidence gleaned from an analysis of both the sound and film record does not substantiate this reasonable expectation. For instance two individuals, N and F, secured or were accorded a major proportion of his attention, but observations made in and out of the classroom showed healthy peer relationships, better than average ability, healthful spontaneity, and considerable self-sufficiency and self-direction. Hence, presumably, they least needed the help and support of the teacher. An important factor in this seems, in retrospect, to have been the very spontaneity and social aggressiveness of the two. The study was an eye-opener to both the researcher and the teacher in revealing this imbalance of teacher-pupil interactions. This paper presents the data obtained from an analysis of the still photographs of the class taken from eleven randomly selected sessions.

METHOD OF ANALYZING THE DATA

By examining the photographic record of this class on several days and making a careful tally of the pupils who are seen in the pictures gathered around the teacher, it is possible to obtain an accurate representation of the distribution of interactions between

the teacher and the twenty-six pupils. Interactions are here interpreted to mean that the pupil is within the area encompassed by an imaginary circle around the teacher having a radius of approximately one yard. The pupil alone or with others appears in the photograph to be either conversing with the teacher or listening to the teacher's comments addressed either to him or to the group in the defined area. Since the pictures were taken at fifteen-second intervals they are assumed to represent with some degree of accuracy the total pattern of interactions between pupils and teacher. If we take each fifteen-second exposure in turn and tally each child's contact with the teacher, we get a measure of the attention bestowed by the teacher on each member of his class.

BASIC DATA

The basic data offered here represent the contacts between each of the twenty-six pupils and the teacher during eleven randomly selected class sessions from November 6 to December 11. Most of the sessions were seventy-five minutes in length; three were thirty-five minutes. The first eight sessions were "uncontrolled" in the sense that the instructor was not aware of the pattern of distribution of his time and effort among the members of the class. The final three sessions were "controlled" in the sense that the teacher deliberately attempted, in the light of the analysis made of his interactions during the first eight sessions, to redistribute his time and attention among the pupils more equitably.

ANALYSIS OF DISTRIBUTION OF INTERACTIONS IN "UNCONTROLLED" SESSIONS

The "uncontrolled" pattern of contacts occurred prior to the teacher's being aware of the way in which he distributed his time in his class. The two pupils, F and N, had more than double (three hundred and forty-eight) and triple (five hundred and eighty-one), respectively, the mean number (one hundred and fifty-one) of contacts within the entire group. The total contacts of these two individuals with the teacher accounted for more than one quarter of all (three thousand, three hundred and thirty-seven) the contacts of the twenty-two youngsters for whom data are presented. On the other hand, the combined total contacts of eight other pupils with the teacher—A, fifty-one; H, thirty-nine; Q, forty-three; R, fifty-five; V, fifty-four; W, sixty-four; X, forty-six,

and Y, eighteen—all together account for a total only slightly larger than F's and only about two-thirds of N's total contacts. It would appear that despite the teacher's sincere and avowed desire to facilitate maximum learning of each member of his class and to enhance sound teacher-pupil relationships, some pupils appeared to be taking a far larger share of his time and attention than others. Q, for example, who was a fringer in the peer group, was rejected by the boys, had more than her share of pubescent problems, was the youngest in the class, had the highest IQ, was ungainly, overweight and not a member of a well-knit girl clique, had a deep need for his time and attention.

On the basis of the number of contacts registered in the eight uncontrolled sessions representing five hundred and fifty-five minutes, it is possible to compute the mean number of contacts per hour for each pupil. These data are presented in Table I.

The range in mean number of contacts per hour for each pupil (Table I) is from 1.9 to 62.8, i.e., 60.9. Thus from these data it is

TABLE I.—NUMBER OF CONTACTS PER HOUR FOR EACH PUPIL EIGHT UNCONTROLLED* SESSIONS

Pupils	Contacts per Hour	Pupils	Contacts per Hour
A	5.5	N	62.8
B	34.5†	O	4.7†
C	17.7	P	29.3
D	9.6	Q	4.6
E	6.7†	R	5.9
F	37.6	S	20.2
G	24.1	T	22.5
H	4.2	U	12.1
I	26.1	V	5.8
J	4.3‡	W	6.9
K	17.1	X	4.9
L	13.3	Y	1.9
M	9.4	Z	18.0
		Over-all mean: 15.8	

* The teacher was unaware of the pattern of distribution of his contacts in the class.

† Based on four hundred and forty-five-minute total. Two class periods were missed; one of seventy-five minutes, the other of thirty-five minutes.

‡ Based on five hundred and twenty-minute total. One class period of thirty-five minutes was missed.

apparent that in a sixty-minute class period the teacher would give his attention to N once a minute and only once every half hour to Y.

TEACHER'S CONSCIOUS ATTEMPTS TO REDISTRIBUTE CONTACTS AMONG PUPILS

The conscious attempt by the teacher to spread his attention more evenly within the class came about as a result of a discussion which the researcher had with him during one of their regular staff meetings. At this meeting we discussed the problem of some of the isolates[1] in the class. We were impressed with difficulties facing these individuals some of whom, besides being rejected in everyday situations by their peers, seemed also to be "neglected" by the teacher. It was agreed that both the "fringers" and "isolates" and the "neglects" might be helped if the teacher began to evidence a greater interest in them and their work. The researcher and the class teacher agreed that up to this time little rapport seemed to have been established by the teacher with certain pupils, notably: Q, X, A, O, W, R, C, and L. The teacher was greatly impressed with the findings we had made from an analysis of the classroom interaction and was only too anxious to do what he could to alter the situation that existed. He, therefore, undertook, deliberately, to work more closely with those eight whom we had specifically identified as well as with others in the room whom he may previously have tended to overlook. As a result of the teacher's efforts to redistribute his time so that the "neglects" would get a greater share of his attention, we were able to collect data on several "controlled" sessions. These data are presented in Table II.

ANALYSIS OF DISTRIBUTION OF INTERACTIONS IN "CONTROLLED" SESSIONS

The amount of class time involved in the three "controlled" sessions happens to be exactly one third of the elapsed time in the "uncontrolled" sessions. In the one hundred and eighty-five min-

[1] The isolates were discovered from the information gleaned from recorded, individual, open-ended interviews aimed at assessing peer relationships in this group, since the pupils were too test-wise for the usual sociometric procedures on the basis of our intensive observation of these youngsters throughout the school day in a variety of situations—lunch, gymnasium, social studies, and after-school activities.

TABLE II.—NUMBER OF CONTACTS PER HOUR FOR EACH PUPIL CONTROLLED* SESSIONS

Pupils	Contacts per Hour	Pupils	Contacts per Hour
A	23.7	N	46.4
B	25.6	O	6.2
C	28.8	P	45.4
D	53.7	Q	44.4
E	11.2†	R	12.3
F	72.6	S	18.2
G	Shop‡	T	13.9
H	1.6	U	22.4
I	Shop‡	V	13.1
J	7.0	W	4.8
K	12.0	X	29.8
L	35.3	Y	8.1
M	31.5	Z	27.6
		Over-all mean: 24.8	

* This term denotes the teacher's conscious attempt to distribute his attention more equitably among his pupils.

† Based on one period of seventy-five minutes.

‡ These two pupils worked during all three periods in the craft shop on a project and were not in the classroom.

utes of the controlled sessions, F amassed two hundred and twenty-four contacts out of a grand total of one thousand, seven hundred and twenty-nine; this represents approximately twelve per cent of the total recorded contacts in the class. She and the pupil who amassed the next highest number of contacts , i.e., one hundred and seventy-four, together account for twenty-three per cent of the one thousand, seven hundred and twenty-nine contacts. F had slightly more than, and D slightly less than twice the mean number of contacts for the class. The combined total contacts of five pupils used for comparative purposes in the analysis of the "uncontrolled" sessions, i.e., A, Q, R, X and Y account for a total that is one and a half times as large as F's total contacts and double D's total. That is, the two pupils with the largest number of contacts did not take as large a relative share of the teacher's attention as they had taken in the "uncontrolled" situation. It must be noted, incidentally, that F received 37.6 contacts per hour in the first series and 72.6 in the second series—almost twice as many—*after* the teacher tried to even things up!

On the basis of the number of contacts registered in the three controlled sessions representing a total elapsed time of one hundred and eighty-five minutes, it is possible to compute the number of contacts per hour for each student. The mean number of contacts per hour in the uncontrolled sessions was 15.8 (see Table I); the mean number of contacts per hour in the controlled is 24.8 (see Table II).

CONCLUSIONS

Figure 1 is a columnar representation of the percentage of the total number of contacts with the teacher made by each individual[2] during eight "uncontrolled" class sessions totalling five hundred and fifty-five minutes and three "controlled" sessions totalling one hundred and eighty-five minutes.

An examination of the cumulative histogram (Figure 1) emphasizes the relative changes in the distribution of the teacher's contacts within a class as a result of his deliberate attempts to ensure a more balanced distribution of his time and efforts among its members. The increase of nine (fifty-seven per cent) in the mean number of contacts per pupil per hour in the controlled sessions (Table II) over the mean number in the uncontrolled sessions (Table I) further underlines the change that occurred.[3] However, despite the appreciable redistribution of teacher-pupil contacts in the situation, it seems reasonable to assume that the desideratum as regards the distribution of contacts with each pupil by the teacher was not realized.

It appears that we may not readily assume that even a teacher who displays a high degree of social sensitivity and who develops considerable rapport with his pupils will distribute his attention in the way which he and others on the basis of objective evidence and assessment of each pupil's needs would deem desirable and necessary. Likewise, it seems that once the teacher has been apprised of the "imbalance" of the distribution of his time and efforts among his charges, it is no simple task to redistribute his attention. None-

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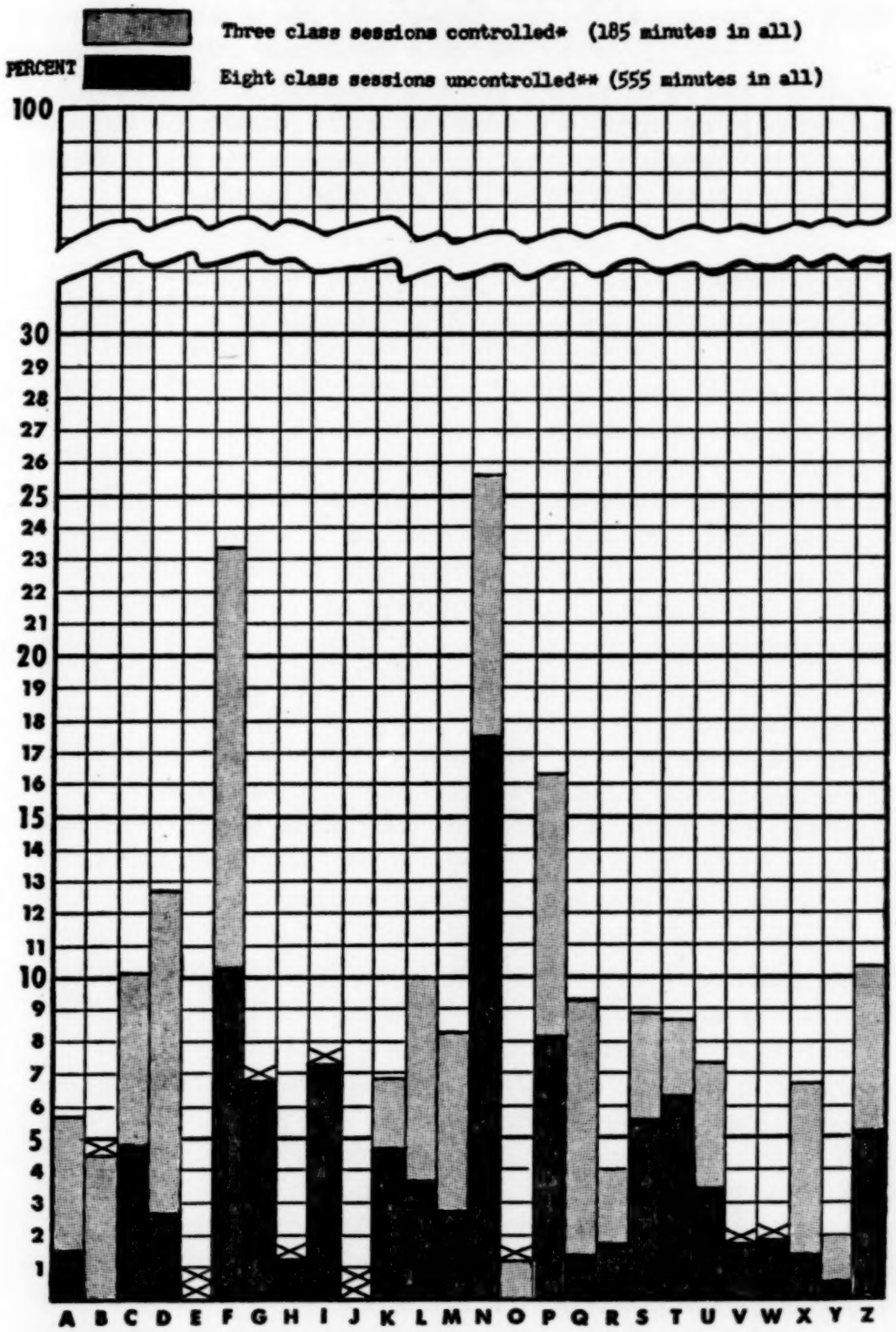
[2] Four of the pupils each missed one class period and are, therefore, not included in the tabulation.

[3] Pearson's coefficient of variation, i.e., $V = \frac{6}{M} \times 100$ when computed on the basis of the data drawn from both the uncontrolled and the controlled sessions gives a V of 80.7 in the uncontrolled and a V of 57.5 in the controlled.

FIGURE 1—PERCENTAGE OF TOTAL NUMBER OF CONTACTS WITH TEACHER BY EACH PUPIL DURING ELEVEN CLASS SESSIONS



* Controlled—Teacher deliberately sought to distribute his efforts and attention more equitably in his class.

** Uncontrolled—Teacher was unaware of the distribution of his efforts and attention in his class.

X in column denotes absence of pupil from classroom during series of sessions.

theless, it appears likely that through the use of small, cohesive, working groups (*1*) of learners who encompass among them the scholastic and social skills required for enhancing both group and individual productivity, a teacher may make considerable improvement in the direction of becoming more accessible to all his charges and hence a more effective facilitator of pupil learning.

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A READING-CENTER APPROACH WITHIN THE CLASSROOM[1]

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The uniqueness of reading-center materials and techniques as utilized within that environment often posits queries about the possibility of applying such procedures to regular classroom reading instruction. If the potentialities of reading-center techniques are considered from the standpoint of their contribution to reading in general, an analysis of some of the underlying characteristics of their procedures may possibly serve to stimulate the reading accomplishment of youngsters ordinarily uninfluenced by the reading-center experience. It is, likewise, possible that experimentation within the classroom may divulge adaptations and uses of materials, which have not previously been evaluated sufficiently to establish their full impact upon reading as it is commonly taught to the great majority of children. One may rightfully say that a more articulated combination of classroom and reading-center approach to reading problems generally can result from this study.

The reading center of the Dearborn Public Schools is organized about two facets of purpose somewhat unique in the attainment of reading goals. The first is concerned with the remedial aspects of reading for youngsters who are transported to the center for five half-days a week of concentrated reading help but who return to their regular classrooms in the afternoon. The center affords opportunities to apply diagnosis and remedial work to the needs of severely handicapped readers who, because of average or better than average abilities, can be expected to attain a much higher status in reading skills. The second and more important facet concerns the in-service training of teachers in the techniques and procedures of remedial reading as practiced at the center. Five teachers from the elementary grades are assigned to the reading center for a period of six weeks. In the morning these teachers work with two pupils each at the center. In the afternoon the teachers participate in case discussions and assemble as well as develop reading

[1] Presented before the reading section of AERA, Cleveland, April, 1955.

materials which they utilize upon return to the classrooms. The present collection of materials contains one thousand thirty-four reading booklets—fourteen primers, forty-nine grade-one and one hundred twenty-one grade-two readers, and one hundred ninety-seven, two hundred ninety-five, two hundred nine and one hundred forty-nine booklets, respectively, for grades three to six, the increased number of the latter being explained in part by the increased skills within these grades. The dominant purpose of the reading center is to provide a remedial internship for teachers on the assumption that this practice will spread the techniques of teaching reading throughout the system and will materially reduce the number of reading problems within the classroom.

At the time that the local reading center was established in 1949, a national survey of reading remediation services was floated (*1*). The replies from nineteen public school systems revealed a pattern of function which Dearborn equaled or surpassed in such associated services as the training of teachers, reading diagnosis, the construction of reading matter, psychological case work, related consultation, and follow-up. The enrollment at the center is ten pupils. Since 1949 approximately one-hundred fifty teachers have experienced a six-week internship at the center. This study attempts to provide an insight into the possible classroom adaptation of the reading center methods as they might be applied to a cross section of the reading population.

THE PROBLEM

The reading center, as part of its remedial technique, stresses an individualized reading approach with its retarded readers. Once the reading level of a pupil has been determined, he is encouraged to read at his own rate and level provided that a standard of comprehension and of skill is maintained. Both story and skills types of reading materials are employed during the remedial process. An individual card is maintained, which serves at any time as an index of reading progress. If a negative history is found on this card, it indicates a need for the application of more specialized remedial techniques.

For the purposes of this study, the individualized reading approach was utilized as one experimental variable within the classroom and was substituted for the basic reading program. The classroom teacher's six-week internship had provided an under-

standing of the nature and application of the reading materials which she had helped to prepare. The individualized reading program as applied at the center is horizontal in scope, in that it is identified with a grade level of difficulty, as for example, grade three. To challenge the next level of reading-center materials, a student would have to be promoted to the next grade, as for example, grade four. Three hundred minutes are allotted the basic reading program weekly, the same as that for the individualized reading approach in the study.

While the horizontally individualized technique, as described, represents an extreme form of experimentation when compared to the conventional basic reader program, two additional experimental techniques were utilized which represented compromises between the basic and the individualized as practiced at the center. In one compromise approach, the use of reading-center techniques and of materials was restricted to approximately forty per cent of reading time, or to about one hundred and twenty minutes, the remaining one hundred and eighty being allotted to the basic reading program. In another compromise approach the application of reading-center materials was increased to seventy per cent of the reading time or to slightly more than two hundred minutes per week. The psychological influence of over-reading, namely over-learning, as imposed by the horizontal concentration of reading in the individualized approach would be less operative in these compromise approaches, should it exist, and would permit the students a varying amount of contact with the basic and co-basic readers. The teachers utilizing the compromise-experimental technique had likewise served a six-week internship at the reading center and were skilled in the application of reading-center techniques to classroom instruction.

The control counterpart to the experimental design was the conventional classroom reading situation organized about the basic and work study type of readers. Supplementation through the techniques and materials of the reading center was lacking. The teachers in the control aspect of the study have had no orientation in the use of reading center materials or of its techniques.

SUMMARY OF FINDINGS

Grade Three. The grade three groups in the study were equated upon such pre-test data as intelligence, achievement in reading,

and in the skill of map reading. The background data consisted of an initial evaluation, using the Metropolitan Primary II Reading Test and a final one using the elementary form of the Iowa Every Pupil Test, the change being made because of the marked growth of several pupils in reading ability. Two forms each of the Gates Basic Reading Tests and of the Dearborn Map Reading Test were likewise administered. The Monroe Basic Reading Test used for a summary appraisal of pupil progress in the local grade-three reading program was given as a terminal test only. In the remaining grades, however, the Iowa Every Pupil Tests were utilized for obtaining the comparative data of Table I, the choice of form being determined by the reading and grade status of each group. Seventeen youngsters were paired for the duration of the study. The average intelligence quotient of the conventional basic reading group was ninety-three, while that of the individualized was ninety-four. One can rightfully assume that the mental ability of several pupils within each group was below that of the reading-center group and hence involved that portion of the student body where reading problems might be common within the classroom. The grade three at the Maples School represented the control variable or the basic reading approach, while the William Ford School experimented with the free use of reading-center materials concentrated about a grade three level of difficulty. The reading center is located at the latter school.

A mean pre-test difference significant at the one per cent level of confidence favored the conventional reading group on the Gates pre-test, type C, understanding precise directions. In general, the pre-test differences on the Gates reading test, types A, B, and D, were likewise slightly advantageous to the basic reading group. The Gates reading tests represent a vital part of the diagnostic evaluation of the reading-center techniques.

The pre-test data of grade three as obtained by the Metropolitan reading test had indicated reading superiority of the conventional group. At the culmination of the experiment, the individualized reading group attained on the Iowa Every Pupil Test a status or grade level within a month of the conventional group. The comparisons in the succeeding grades were made through the Iowa tests only. Refer to Table I for mean score and grade level attainments of all groups. Since achievement on the Iowa tests is the preferred criterion of reading status within this grade locally, it appears that

TABLE I.—READING SCORES AND DIFFERENCE AFTER ONE YEAR USING VARIOUS METHODS OF READING INSTRUCTION

	I.Q.	Pre-		Final	
		Score	G.L.	Score	G.L.
Grade 3B-A (N = 17)					
Conventional (Maples)	93	52.1	3.7	79.5	3.8
Individualized (Wm. Ford)	94	45.0	3.3	76.8	3.7
Months' difference			4		1
Grade 3B-A (N = 9)*					
Compromise 40% (McDonald)	111	44.9	3.3	44.2	4.0
Individualized (Wm. Ford)	107	49.0	3.5	41.7	3.8
Months' difference			2		2
Grade 4B-A (N = 14)					
Conventional (Maples)	112	53.2	4.2	59.9	5.1
Compromise 40% (Wm. Ford)	110	53.2	4.2	68.9	5.8
Months' difference					7
Grade 5B-A (N = 17)*					
Conventional (Wm. Ford)	113	80.1	6.0	51.8	7.0
Compromise 70% (Maples)	114	78.2	5.8	58.9	7.6
Months' difference			2		6
Grade 6B-A (N = 17)					
Conventional (Maples)	112	55.7	6.3	66.4	8.2
Compromise 40% (Wm. Ford)	112	55.2	6.3	59.7	7.7
Months' difference					5

Score differences $P > 0.05$

* Pretest-elementary form; final-advanced form.

the individualized reading content did not penalize the attainment of vocabulary or of comprehension when substituted for the basic reading program within grade three. As a rule the conventional group retained its original superiority on the Gates tests, types A, B, C, with type D showing a significant gain in the final evaluation. The conventional group, in addition, gained a statistically significant difference in the study skill, use of maps.

As an additional evaluation of the total experiment, Marion Monroe's Basic Reading Test ordinarily administered with the basic reader was given to the conventional as well as to the individualized reading groups of grade three. A statistically significant difference between means, 96 and 72 or 24, was established at the one per cent level of confidence in favor of the conventional reading group. This result is not surprising since the Monroe tests measure direct recall of the content of the basic reader and are used in conjunction with it. The mean classification category for the conventional group was *good* as compared to *poor* for the individualized approach.

The post-experimental follow-up of the achievements of the individualized and of the conventional groups a year later, or at the end of grade four, indicated the mean grade level status of each group to be 5.3 or likewise equal as they were at the termination of the experiment. Within grade four, the individualized group used in equal proportion the reading-center technique along with the basic reader. Through the follow-up data, one may infer that the experience with reading-center techniques and materials did not deter adjustment to the basal reader approach despite marked differences in the organization of content and procedure. One may, likewise, observe that the contributions of specialized reading techniques should be appraised upon residual improvement beyond the detail of the experiment lest one mitigate the influence of chance growth, teacher personality, teaching skill, class size, or time allotment as elements of remedial outcomes.

An attempt was likewise made in grade three to compare the achievement of a partially individualized basic reader group with that of a completely individualized one. The William Ford School participated again as the experimental variable, while the McDonald School acted as the control variable. However, the latter school limited the individualization to forty per cent or to one hundred and twenty of the three hundred minutes allotted weekly to read-

ing. The remaining time was devoted to the use of the basic and the co-basic readers.

The pre-test data indicated insignificant but accelerated abilities of the individualized group in reading, map reading and the Gates tests A, B, C with statistical significance for pre-test D, reading to denote details. The partially individualized or compromise group had slightly higher intelligence ratings. Only nine pupils remained for the two-semester period of study.

After a year's application of the two degrees of individualized control of reading content, the compromise group with forty per cent of time devoted to reading-center materials gained more in reading achievement than did the group utilizing the reading-center materials one hundred per cent of class time. On Gates tests C and D, reading to understand precise directions and reading to denote details, the group differences diminished to insignificant ones, major gains being made by the compromise group.

From the limited inference permitted from the above review, the problem needs to be more fully explored as to the degree to which reading materials contribute most critically in proportion to reading time within the regular classroom program. As suggested in grade three, the time appears to be less than one hundred per cent.

Grade Four. Within grade four, a conventional basic reading group was paired with a compromise group exposed forty per cent of the time to reading center materials of a grade four level of difficulty. The average intelligence quotient of the compromise group was 110 and that of the conventional was 112. Both groups attained identical pre-test scores on the Iowa Every Pupil Test of Reading and slight differences were likewise found for the Iowa Study Skills in such abilities as map reading, use of references, use of index, use of dictionary and alphabetization. Since work-study type of readers are part of the local basic reading program, it was desired to appraise possible losses or gains in such achievement as they may have been influenced by the compromise technique of the reading center which also incorporates skills into its individualized content. The pre-test data indicated insignificant group differences in comparative scores on tests A, B, and D of the Gates reading series and a significant difference on the side of the compromise group for test C, understanding precise directions.

If one again uses the final results of the Iowa Every Pupil Test

of Reading as the criterion of growth, larger if not significant gains were made by the compromise reading group. The interim gain is shown in Table I for grades four to six based upon the Iowa tests. This gain when interpreted through grade-level comparisons is of a seven-month difference between mean achievements. The compromise or experimental group achievement on the Iowa Every Pupil Test of Basic Skills, namely, map reading, use of dictionary and alphabetization had shown greater increases for the compromise group. The final tests of the Gates reading series portrayed the retention of superiority of the compromise group on the four types of skills evaluated. Fourteen students were paired within the grade four groups.

The grade four results permit one to generalize that the compromise group, oriented forty per cent of time through horizontally controlled content, did show larger reading gains than did the group exposed to the basic reader. The horizontal technique also failed to impose a penalty on the acquisition of study skills since, speaking conservatively, the attainments were at least equal.

Grade Five. Within grade five, still a different degree of individualization was utilized. In this part of the study, the reading center method was applied seventy per cent of time, the remaining time or ninety minutes weekly was allotted to the basic reading technique. The seventeen pupils equated for the study disclosed homogeneity in intelligence, reading achievement, and the work-study skills. The Gates reading pre-test scores indicated a significant superiority of the compromise group for test type A, appreciating general significance and test D, reading to denote details.

Here again the compromise group had shown a greater gain in vocabulary and comprehension through the Iowa Every Pupil Test of reading achievement. At the conclusion the compromise group attained a higher grade level status in vocabulary and in comprehension achievement. Because of the reading ability of the groups, the advanced edition of the Iowa Every Pupil Test was administered in the final evaluation instead of the elementary, thereby explaining the difference in the scores and corresponding grade levels. The compromise group likewise retained its relative position in achievement on four of five study skills tests. This was likewise true in the final evaluation of Gates Basic Reading Tests in which three of four outcomes maintained increments equal or above that of the pre-test status.

Grade Six. The experiment within grade six reverted to a forty per cent utilization of reading-center materials. The average intelligence quotient of each group was 112; the reading abilities at the beginning of the study were likewise identical. The conventional group was significantly superior at the start in the work study skill, use of maps and accelerated in the study skills use of index, use of dictionary and the reading of graphs, charts, and tables. The initial results of the Gates Basic Reading Tests also indicated a superior background on all four reading skills.

At the end of the experiment a year later, the conventional basic reading group showed superiority in silent reading and maintained its advantage on all five work-study skills. The conventional reading group likewise added to its differential of scores originally obtained through the Gates Basic Reading Tests, significantly so on type D, reading to denote details.

An additional variant was accepted in the grade six experiment which was lacking in the preceding grades. A substitute teacher was involved in teaching the experimental group for five weeks, while the regularly assigned teacher was concluding his internship at the reading center. Without this concession, the experiment would not have been possible at the grade six level. Since the substitution had taken place at the beginning of the semester, one might infer that the differences in results had been but mildly affected by the teacher changeover. Greater experience in the teaching of reading, however, must be recognized on behalf of the teacher of the conventional group. It was felt that this difference represented a major departure in this ability only within grade six.

OBSERVATIONS

(1) In three of four experimental grade situations, sufficient gains had been made in silent reading abilities of vocabulary and of comprehension to recognize that the application of reading-center techniques in toto or in part is worthy of consideration within the classroom.

(2) It is possible that reading gains made through the experimental use of reading-center materials may, in part, be attributed to the motivation inherent in the technique since recognition, the feeling of attainment, and the fulfillment of task are more discernible in the method of the reading center. The grade three teacher of the experimental group commented as follows: "The children's

interest is still keeping up. Time and again when told to put their books away, they asked for extra time."

(3) The children expressed their viewpoints in this way: "The stories in my book are interesting." "When I get a new series, I read more books." "I like to read because we don't have to read the same stories." "We don't have to sit in a circle in front of the room."

(4) Since pupils with sub-average mental capacities are least considered as candidates for reading-center or reading-clinic aid, special study should be given the potentialities of individualization for meeting the needs of slow learners especially those with intelligence quotients below 90.

(5) In order to rule out the booster effect of specialized reading techniques, of the teacher variable, and of the appraisal error, long-term follow-up should be instituted to more adequately disclose residual gains in reading comprehension along with the relative values of succeeding techniques.

(6) The Gates tests of basic reading were introduced into the study since they serve as criteria of growth at the reading center. It is questionable whether emphases per se were placed upon such outcomes as appreciating general significance, reading to predict outcomes, understanding precise directions, and reading to denote details, or whether such outcomes are a chance result of growth in the skill of reading comprehension. The inconsistent pattern of achievement of the control and of the experimental groups on the Gates tests seems to suggest such an inference. Teachers challenged the reliability of low scores about a broad sampling of reading content extrapolated, in part, from a grade level range of 2.8 to 12.5. Teachers of the experimental groups skilled in the application of the Gates test failed to gain advantages beyond those of a chance nature.

REFERENCE

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DIRECTED VERSUS INDEPENDENT DISCOVERY OF ESTABLISHED RELATIONS

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Experimental evidence favors some degree of learner activity over the specification of correct answers by the teacher or experimenter (*3*, *6*, *7*). But the results have been interpreted too broadly as implying that the more freedom of activity and, hence, the less external direction, the better (*3*, p. 15; *5*, p. 141; *8*, p. 80).

A recent experiment, similar in materials and design to the one reported here, dealt with the effect of external direction to aid the learner in his search for established relations among given concepts upon the learning and application of these relations (*1*). The results suggested that learner activity should be directed for efficient learning of principles. The advantage of direction, however, may be temporary. Advocates of unaided discovery may admit that fewer relations were learned when external direction was not provided, but they might well ask if those that were learned independently would not be remembered better and used longer than those learned with the assistance of the teacher or experimenter. Also, evidence is needed as to the effect of external direction on the learner's ability to solve future problems involving unlearned principles when external direction is not available. The hypothesis tested in the present experiment was that increased direction of discovery activity effects increases in learning without accompanying losses in retention or transfer.

MATERIALS AND PROCEDURES

Two groups of college students were each given a different amount of direction to help them discover the bases for the solution of a series of learning situations. A pre-test was used to measure initial knowledge of these relations. The number of relations actually learned by each subject was the difference between the number known at the final learning trial and the number known before training. The pre-test was given a second time as a post-test

[1] Now at American Institute for Research, Pittsburgh, Pa.

to measure the relative effects of the two degrees of direction on retention. A second post-test measured the post-training ability of each group to discover the bases for the solution of new situations independently. Confirmation of each learner's knowledge of post-test relations was obtained by asking him to write out the reasons determining his answers. The remaining paragraphs of this section describe the elements of the experimental materials and procedures in detail.

SUBJECTS

The subjects for this experiment were two groups of fifty-three sophomores and juniors enrolled in the experimenter's education courses at the State College of Washington. Forty-nine were men, fifty-seven were women. Each group was a fifty per cent random sample of the author's undergraduate students during the fall semester of 1953–54.

The two groups were similar with respect to initial test performance. The mean ACE score of the group receiving more direction was 99.24; S.D., 21.73. The mean ACE score of the group receiving less direction was 101.08; S.D., 22.48. The mean number of relations identified by the directed group on a pre-test composed of items organized on the same bases as the learning series was 6.00; S.D., 2.62. The mean for the second group on this pre-test was 5.52; S.D., 2.44.

PRE- AND POST-TESTS

The pre-test and first post-test for knowledge of relations consisted of sixty items—a group of four for each of fifteen organizational bases. A second post-test, consisting of forty items—a group of four for each of ten other organizational bases—was used to measure post-training ability to discover and use unlearned relations.

The following item illustrates the type of verbal problem used throughout this experiment:

(A) coin (B) plate (C) button (D) ball (E) wheel

The five words of each such item were selected so that the four are related in some manner. The learner's task is to select the word that does not belong with the other four. To solve this and similar

items efficiently, the learner must apply the general relation to the specific objects named.

The learner's determination of the basis for a correct response, including both the general formulation of the relation and its application to specific items is called "discovery of established relations." Spearman elaborated the process as one of his principles of cognition termed "the eduction of relations" (*4*, p. 63). His statement of the principle is, "The mentally presenting of any two or more characters (simple or complex) tends to evoke immediately a knowing of relation between them." Any one test situation is more restrictive than the general principle as stated, however, in that the relation of interest is a particular pre-selected or "established" one rather than any known. Formal learning is frequently so restricted. Of the many relations that a learner may perceive among the elements presented in a science lesson, for example, only the one selected by the teacher or curriculum maker will be considered important or, as an answer, correct.

Pre- and post-test items were based on relationships among the five words of each item. In each item the correct answer was determined by the sound of the words, the spelling of the words, familiar combinations of words, the meaning of the words, or combinations of sound, spelling, arrangement and meaning. The organizational bases and items have been published elsewhere (*1*). The example for sound relationships given below is illustrative.

Sound Relationships

Form two pairs of words beginning with the same sound.

1. **(A)** ***cycle*** **(B) seldom (C) sawdust (D) sausage (E) cellar**
2. **(A) rapping (B) wreckage (C) wrapper (D) reckon (E)** ***reason***

Four items illustrating each relation were grouped together and separated from other items by spacing. No statements or other clues to the bases for correct response were included. The item groups were arranged in random order. If a subject solved all four of the items organized on a given basis correctly, he was given credit for knowing that relation. If he failed to solve any one of the four, he received no credit.

The tests were designed for group administration with all necessary directions at the top of the first page. The directions called the learner's attention to the existence of reasons for correct an-

swers but gave no clues to the nature of the reasons other than that provided by the grouping of items. These directions follow:

Words That Don't Belong

Directions: Each item of this test consists of five English words. In each item there is one word that does NOT belong with the others for some reason.

The items have been grouped in sets of four organized on the same basis, that is, the reason one word does not belong with the other words of the item is the same for each of the four items in a group. Different principles are used for different groups.

For each item, underline the word that does not belong with the others of the set. Answer every item. If you do not know the answer, guess.

Data from an independent but comparable group of one hundred and ninety-three students were used to determine test reliability. Since all subjects completed the tests within the time limits, split-half procedures were appropriate. As there were four items organized on each basis, two equivalent halves were formed by randomly choosing two of the four for each half-test. The two half-tests were scored separately for number of relations known, and the two sets of scores were correlated. The resulting correlations gave 0.93 as the estimated reliability coefficient for the pre-test and longer post-test and 0.90 for the forty-item post-test.

LEARNING MATERIALS AND TREATMENT

Groups of items of the same type that were used for pre- and post-tests were used for learning material. Two combinations of clues to the reasons determining correct responses to these items provided two different degrees of direction during discovery. The two combinations of clues were incorporated into two sets of learning materials suitable for group administration. The administration of the two sets of materials, each to a different group of subjects, constituted two different treatments during learning. A consistent procedure was used that had been thoroughly pre-tested in previous experimentation (*1*).

The learning materials for the group who searched for principles with relatively little direction (the independent group) consisted of items arranged in the same manner as the items of the pre-test; that is, items organized on the same basis were grouped together and separated from other items by spacing.

Each subject was immediately informed of the correctness of

right choices and of the incorrectness of wrong choices. Learners were instructed to continue to choose on each item until the correct response was discovered. A cardboard-backed answer sheet was used to inform subjects as to the correctness of their responses. When the subject marked the space corresponding to the correct answer choice, his pencil tip dropped into a hole in the cardboard backing. The holes corresponding to the right answers penetrated only one layer of the corrugated backing; thus, no holes were visible to the subject. If he blackens a space he believes to be correct and his pencil tip does not fall into a hole, he knows his choice is incorrect; if his pencil tip does fall into a hole he knows he has succeeded.

No information was given the independent group that might suggest the nature of the reasons for correct answers, but learners were told that the correct responses to all items of a given group were determined by the same organizational principle. With this information, the learner's attention is directed to similarities among the items of each group; he may search for this similarity to help him in his discovery. The instructions given this group were the same except that the following was added:

> **If your choice is correct, your pencil tip will pierce the answer sheet and fall into a hole in the cardboard backing. Thus you will know whether your choice is correct.**
>
> **If your first choice is not correct, choose again. If the second space is also incorrect, choose again. Continue to choose until you discover the correct answer.**
>
> **Do not spend too much time on any one item. Mark your choices on the separate answer sheet. Make no marks on the test booklet.**
>
> **The more incorrect choices you make before discovering the correct answer, the lower your score will be. So, mark no more spaces than necessary to discover the answer. Do not erase.**

The learning materials for the directed group differed from those for the independent group in that the learner was provided with a short general statement of the relationship common to the items of each grouping to direct his discovery. Each such statement was printed on the learning materials immediately preceding the item group to which it applied. The example which was presented to illustrate the several types of relationships also illustrates the nature of these statements and the placement of the statements with respect to the item groups.

The instructions given this group were identical with those for

the independent group with one important exception. The following sentence, "The principle applying to each group of four items is stated just above the group." was substituted for the sentence, "Different principles are used for different groups."

The learning treatments began three days after the administration of the pre-test. The sequence followed by each group of learners was as follows:

First Day: Discovery of correct responses to two illustrative items for each of five different organizational bases selected at random from the fifteen relations of the pre-test (Set A).

Third Day: Discovery of correct responses to two additional illustrative items for each relation of Set A.

Fifth Day: Discovery of correct responses to four illustrative items for each relation of Set A. Solution of all four items organized on a given basis without error was taken as proof of the knowledge of that relation.

Fifteenth, Seventeenth, and Nineteenth Days: Repetition of the sequence for the first, third, and fifth days with a second group of five randomly selected relations (Set B).

Twenty-ninth, Thirty-first, and Thirty-third Days: Repetition of the sequence for the first, third, and fifth days with the remaining five relations of the pre-test (Set C).

Both post-tests were administered on the third day following the end of the learning sequence or three days after the final learning experience with Set C, seventeen days after the final learning experience with Set B, and thirty-one days after the final learning experience with Set A.

ANALYSIS OF RESULTS

The items of the pre-test and those of the learning series were organized on the same fifteen bases. In this section, performance on the pre-test and during learning are analyzed first to identify the reasons for correct responses which were actually learned during the experiment. Then learners' responses on the post-training administration of the pre-test and subjects' reasons for their responses to this test are studied to reveal the number of relations retained. Finally, learners' responses to a second post-test and their reasons for these responses are analyzed to compare the post-training ability of the two groups to discover and use unlearned relations.

TABLE I.—NUMBER OF RELATIONS LEARNED BY DIRECTED AND INDEPENDENT GROUPS

(Group Means and Variances for Each Set)

Set of Principles	Statistic	Directed Group	Independent Group	Significance Tests*
A	Mean	2.280	1.520	(*t*) 3.84
	Variance	0.910	1.176	(*F*) 1.29
B	Mean	2.560	1.520	(*t*) 5.84
	Variance	0.923	.760	(*F*) 1.21
C	Mean	2.560	1.920	(*t*) 3.03
	Variance	1.257	1.110	(*F*) 1.09
All sets	Mean	7.400	5.080	(*t*) 5.10
	Variance	4.667	6.327	(*F*) 1.36

* Students' *t*'s all significant at 0.01 level; all *F*'s not significant at 0.05 level.

NUMBER OF RELATIONS LEARNED

The pre-test consisted of fifteen groups of items—a group of four for each of fifteen bases—the same fifteen used for learning. A subject who solved all four of the items organized on a given basis on the pre-test or during learning demonstrated his knowledge of the relation at that point in the experiment. The number of relations actually learned by each subject was obtained by determining the number known after learning that were not known prior to learning. The mean number learned and the variance in the number learned by each experimental group are shown in Table I.

Differences in the mean number of organizational bases learned consistently favored the directed group. Students' *t* corresponding to the mean differences for each set was statistically significant at the 0.01 level of confidence. *F*-ratios of the variances for each set were not statistically significant. Directed discovery resulted in the learning of more relations than independent discovery.

NUMBER OF RELATIONS RETAINED

The test administered to measure retention was administered three days after the final learning trial with Set C. This was seventeen days after the final trial with Set B and thirty-one days after

TABLE II.—PERCENTAGES OF LEARNED RELATIONS RETAINED BY GROUPS AT THREE INTERVALS AFTER LEARNING

Group	*N**	Mean Per Cent Retained	No. of Subjects by Per Cent Retained					Chi-square
			00.0	20.0 25.0	33.3 50.0 66.7	75.0 80.0	100.0	
Three days after learning (Set C)								
Directed	51	92.61	0	0	4	9	38	4.267‡
Independent	46	90.61	2	0	2†	2	40	
Seventeen days after learning (Set B)								
Directed	53	79.57	4	0	13	4	32†	2.256‡
Independent	47	75.47	6	2†	9	0	30	
Thirty-one days after learning (Set A)								
Directed	53	80.49	0	0	19	2	32†	15.392§
Independent	47	62.32	12	0	13	0	22	

* Number in group who learned at least one relation.

† The bar connects frequencies that were combined for the chi-square computation.

‡ Not significant at the 0.05 level.

§ Significant at the 0.001 level.

the final trial with Set A. Thus, the retention of the two groups was compared over three different intervals of time.

Table II shows the number of subjects of each group retaining each percentage of the learned relations of each set. Because there were only five in each set, only the percentages indicated in the frequency distribution in Table II could occur.

Inspection of Table II indicates little difference among the two groups with respect to retention of Set C, three days after learning, or Set B, seventeen days after learning. With Set A, however, it seemed that more of the directed group than the independent group retained no relations. The mean percentage retained by the independent group continued to decline as the interval since learning increased from seventeen days to thirty-one days; that for the directed group did not. Chi-squares corresponding to the frequency distribution of the two groups for Set C and B were not significant, but the chi-square for the frequencies of Set A was significant at

the 0.001 level. After approximately one month, the directed group retained more learned relations than the independent group.

Analysis of learners' reasons for each response of this test confirmed their knowledge of the organizational bases for item groups solved correctly and their lack of knowledge concerning the bases of items failed. Statements classified as incorrect were ambiguous, admitted guesses or relationships based on faulty observation and analysis of the words. Careful pre-selection of items and the requirement that four items be solved without error before credit was given for a relation apparently eliminated correct reasons other than those anticipated by the experimenter. Examples of the types of statements considered correct and incorrect are available in a previous publication (*1*).

POST-TRAINING DISCOVERY OF NEW PRINCIPLES

A second post-test composed of items based on relations entirely new to the learner was administered three days after the final learning trials. Table III summarizes the results of this test by giving the mean number discovered by each group.

Each group appeared to improve in its ability to discover relations for it solved a greater proportion of these post-test items than of the pre-test items prior to training; and a supplementary analysis indicated that the post-test was more difficult than the pre-test.

The supplementary analysis utilized the independent group of one hundred and ninety-three students of the reliability determination. For this independent group the difficulty of the pre-test relations, in terms of the percentage of the group who answered the corresponding items correctly without training, ranged from two

TABLE III.—NUMBER OF POST-TEST RELATIONS DISCOVERED INDEPENDENTLY
(Group Means and Variances)

Group	Mean*	Variance†
Directed	4.850	2.193
Independent	5.000	1.667

* Student's *t* for difference in means is 0.445, not significant at 0.05 level of confidence.

† *F*-ratio of variances is 1.315, not significant at 0.05 level of confidence.

to eighty-two per cent, with a mean of 41.7 per cent. The range of difficulty for the post-test of new relations was also two to eighty-two percent, but the mean was 35.1 per cent.

Differences between the two groups in mean number of new relations discovered are small and not statistically significant. Again, subjects' reasons for responses confirmed the number of organizational bases known by each group.

DISCUSSION

The results of the present experiment affirm Thorndike's conclusion that "... the widespread limitation of guidance ... to designating errors is a sign of weakness in the technique of teaching" (*9*, p. 147). These college students profited from greater guidance or direction in that they learned more relations. This finding is in sharp contrast with results obtained when correct answers are specified for learners in advance. Stacey, with learning materials similar to those used in the present experiment, found specification of correct answers in advance of pupil discovery activities to be inferior to merely "designating errors" (*6*). On the other hand, the present results agree with previous experimentation as to the effect of direction during discovery on learning (*1*). A reasonable interpretation of these apparently conflicting results seems to be that subjects use and benefit from help given them in their search for bases determining correct responses; but, when correct responses are specified in advance of activity, they neither search nor discover. It is probable that they just try to remember specific responses.

The present investigation went beyond previous experimentation in that the effect of increased direction upon retention and transfer was investigated. The hypothesis that increased external direction that helps learners in their search for established relations effects an increase in the number learned without an accompanying loss in retention or transfer was confirmed for the present context. The group receiving the greater direction retained those learned relations as well as the group learning by more independent discovery. Further, the results suggest that as the interval of time after learning increases to about one month, the group receiving more direction retains a greater proportion of what was learned than the other group. This suggestion has since been confirmed with other subjects and mathematical material (*2*). If there were no differences

in the proportion of learned relations retained, the directed group would still have an advantage because they learned more and, hence, retained more in terms of number.

No differences were found in the transfer problem of solving items involving unlearned relations. Both groups were found to improve in their ability to solve this type of item as a result of the learning experience.

The results of the present experiment add to the evidence indicating that teachers or experimenters should be liberal with suggestions to aid discovery of principles. The desirable degree of direction would include general statements of the relations to be learned.

The limited scope of this experimentation is recognized. The available evidence needs confirmation with other materials, other subjects, other training and retention intervals. Further information concerning the effect of discovery experiences with varying amounts of direction over periods of months or years is critical in the determination of effects on future discovery.

Many have advocated relatively independent problem-solving in the belief that learning situations should be similar to anticipated transfer situations. This point of view rests on the assumption that future discovery of principles will be through independent problem-solving, hence, more like pupil self-discovery than directed discovery. A different view is that problem-solving and discovery are never independent except in the sense that no one is physically present to prompt the learner. Principles previously learned in an area serve to direct discovery. Out-of-school discovery is not independent but directed by the knowledge gained under the direction of previous teachers. The more direction of this kind available to the learner, the more effective his discovery of new relations. The cumulative effect of greater learning through directed discovery over months or years may offset the effect of any lack of similarity between learning and transfer situations and prove to be the best preparation for new discoveries.

SUMMARY

An attempt was made to determine the effect of directing learners' discovery of established relations upon retention and the ability to discover new relations.

Each of two groups of college students was given a different

amount of direction during discovery of the bases determining solution of multiple-choice verbal items. The group receiving the greater direction, including short summary statements of the bases determining correct responses, learned more relations in each of three trials. Three days after learning and seventeen days after learning, the two groups did not differ in the proportion of learned relations retained. After thirty-one days, the directed group retained a greater proportion of those learned than the more independent discovery group. After a total of thirty-three days of training, the two groups improved about equally in their ability to solve problems organized upon unlearned bases.

This evidence indicates that teachers and experimenters should be liberal with information designed to assist learners in the discovery of principles. Large amounts of external direction now may help to insure that the learner will have an adequate background of knowledge to direct his future discovery.

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EFFECTS OF NON-PROMOTION ON EDUCATIONAL ACHIEVEMENT IN THE ELEMENTARY SCHOOL

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INTRODUCTION

Since 1904, when Superintendent W. H. Maxwell published his startling report on retardation in the New York City schools, the problem of liberal promotion standards vs. promotion based on rigid minimum standards of achievement has been subjected to much serious consideration by educators. Today, some half a century later, the issue remains unsettled. This is particularly true at the elementary school level where practices extend through various degrees of compromise from adherence to a rigid minimum standard of achievement to automatic annual promotion. During this period, a number of research reports pertaining to this problem have appeared in the literature. These include investigative studies of age-grade status, school policies and practices, the extent of non-promotion, the causes of grade repetition, and the effect of non-promotion on the pupil. In addition to such reports, hundreds of articles advocating an opinion or describing a local practice have also appeared.

It is clear that the trend during this period has been in the direction of a decrease in the relative frequency of failure in the form of non-promotion. Larson (*10*) reports that at the turn of this century some fifty per cent of the pupils had experienced failure by the time of completing their elementary schooling, that this proportion was approximately halved by the thirties, and that at the present (1954) time it is of the order of ten per cent. In no sense, however, should this trend be interpreted as indicative of a settled issue. Vituperative critics of the present-day school refer to it as "the only institution this side of heaven that rewards intention as generously as it does accomplishment" (*6*) and decry the practice of promoting

"all children at the end of each academic year regardless of whether their work has been good, bad or indifferent." (*4*) (See also *6*, *12*).

In a very general way, the major arguments for and against automatic annual promotion may be set down as follows:

Pro	Con
(1) A child must experience success if maximum development is to occur.	(1) If no minimum standards are maintained for promotion, children will lose respect for scholarship and the quality of their school work will degenerate.
(2) Failure or the fear of failure leads to frustration which results in a thwarting of development.	(2) Since most people are at one time or another in the course of their lives confronted with a failure situation of some type, school failure is consistent with reality and may serve to prepare certain pupils to face life more intelligently.
(3) Individual differences are of such character as to make the imposition of a single minimum standard completely incompatible with the aim of universal elementary education.	(3) Automatic promotion offers no incentive to the brighter, hard-working child and appears to reward the dull and indolent.
(4) There is very little, if any, evidence to show that ultimate mastery of school work is enhanced as a result of grade repetition.	(4) The automatic promotion of a slow learner increases the degree to which he lags behind his classmates and accentuates the problem of dealing with individual differences at the upper grade levels.
(5) A failed pupil represents an added operational cost which cannot be justified in terms of the negligible gain in mastery which accrues from repetition.	
(6) The imposition of minimum standards tends to increase pupil variability in the upper grades with respect to age, interests, and physical and social maturity, and accentuates the problem of dealing with individual differences at this level.	

Possibly some of the arguments on both sides are valid to some degree. Clearly, some are purely statements of opinion—others have some evidence in their support. Briefly, such evidence as exists indicates (1) that when failed and non-failed pupils are paired off or matched in terms of mental ability, there is little, if any, over-all difference in their educational achievement during the next one or two years (*3*, *7*); (2) that when failed and non-failed pupils are matched in terms of mental ability, socio-economic status and age, there is at most a very small difference, if any, favoring the non-failed pupils in quality of personal and social adjustment (*2*, *8*); (3) that when the pupils of classrooms threatened with failure at the outset of a semester are compared with those of classrooms assured promotion, there are no noticeable differences in over-all achievement at the end of this semester, though teacher opinion seems to be indicative of a somewhat higher pupil morale in the latter type of classroom (*11*); and (4) that when schools are classified as high and low rate of non-promotion schools, the average level of pupil achievement is higher in the latter type school while the variability in pupil achievement is approximately the same for both types (*1*, *5*). If, as the present evidence seems to suggest, there is little apparent difference in either the subsequent educational achievement or the personal or social adjustment of matched failed and non-failed pupils, then determination of policy must rest on other bases than these.

The writers recently undertook an investigation intended to add to the accumulating evidence on the relative quality of educational achievement of matched promoted and non-promoted pupils. The purpose of this paper is to report the methodology and findings of this study.

THE SUBJECTS

Superintendents of three hundred and two Iowa school systems which had a long history of participation in the Iowa Basic Skills Testing Program were asked to identify from among pupils enrolled in grade seven in the 1953–54 school year those who had experienced failure once since, but not during or before second grade, and to indicate the grade in which this failure occurred.[1] Replies received from two hundred and eighty-nine (95.7 per cent) of these

[1] Pupils who experienced failure during or before second grade were not included because test results were not available for any grade below third.

superintendents resulted in the identification of one hundred and ninety pupils—including forty-three whose failures occurred the previous year in grade seven—for whom test results were available in the files of the Iowa Testing Programs.

The one hundred and forty-seven pupils who had experienced failure in one of the grades from three through six were further divided into two groups. The pupils (ninety-three) in one of these groups were each matched with a pupil who was a promoted classmate in the grade in which the failure occurred, on the basis of the particular achievement variable studied. These ninety-three pupils were all those among the one hundred and forty seven for whom such matching classmates could be found. The remaining pupils (fifty-four) comprising the other group were similarly matched with promoted pupils, but in this case the promoted matchees were selected from another school system. Hereafter, these two types of matching will be referred to as *internal* and *external*, respectively.

Ideally, of course, we are concerned with the comparison of a failed pupil's educational development as against his development had the failure not been imposed. Obviously, since a given pupil cannot at the same time be both promoted and failed, the use of a matching pupil is essential. In matching a failed pupil with one of his own schoolmates (internal), the general conditions under which the failed pupil would have studied had he been promoted are maintained for the matchee. However, it is to be expected that in this type of matching a bias favoring the promoted group will be introduced, for even though each pair is perfectly matched in terms of obtained test scores, the fact that one member is passed while the other is not indicates that in the best judgment of the room teacher, some difference in favor of the promoted pupil exists between them. It was for this reason that external matching was also employed. Here, obviously, the general conditions under which the failed pupil would have pursued his education had he been passed are not maintained for the promoted matchees. On the other hand, the possible bias introduced as a result of internal matching is not as likely to be present—at least not to the same degree.

THE CRITERION VARIABLES STUDIED

As has been indicated, the concern in the investigation here reported was with educational achievement. The following standard scores (grade equivalents) yielded by the Iowa Tests of Basic Skills (*9*) were employed as criterion measures:

(1) Reading Comprehension—Test A1.
(2) Work Study Skills—Composite for Section B.
(3) Language Skills—Composite for Section C.
(4) Arithmetic Skills—Composite for Section D.
(5) An over-all composite based on the sum of the above four scores.

These five measures were available for each failed subject (1) for the year in which failure occurred; (2) for the year following failure; (3) for two years following failure—except for the forty-three pupils who incurred failure in grade seven; and (4) for the 1953–54 school year during which all failed pupils involved were enrolled in grade seven.

COMPARISONS STUDIED

The comparisons made were of two general types. In the first type (hereafter designated as Type 1) the failed pupil was, in effect, compared with himself, whereas in the second type (Type 2) the failed pupil was compared with his promoted matchee. Several comparisons involving different periods of elapsed time were made under each general type. These individual comparisons which were made with reference to each of the five criterion variables were as follows:

Comparison 1.1[2]: Scores reported for failed pupils for year of failure with scores reported for these same pupils one year later (i.e., during the second year in the same grade).[3]

Comparison 1.2: Scores reported for failed pupils for year of failure with scores reported for these same pupils two years later (i.e., when the pupils were in the next higher grade).

Comparison 2.1[4]: Scores reported for failed pupils for year fol-

[2] I.e., Comparison 1 under general Type 1.

[3] The Iowa Tests of Basic Skills are typically administered in Iowa schools during the latter part of January. Thus the initial measurements were obtained after the pupil had spent approximately five-ninths of the school year in the grade failed. The final measurements in the case of Comparison 1.1 were obtained one year later and after the failed pupil had spent approximately five-ninths of the school year in repeating the grade failed. While the pairs of scores thus obtained are lower than would be the case had the measurements been taken at the close of the school year, it is doubtful that the comparative differences are much affected. In any case, the validity of the comparisons for the basic purpose at hand should not be seriously affected.

[4] I.e., Comparison 1 under general Type 2.

lowing failure (i.e., second year in same grade) with scores reported for promoted matchees for this same year (matchees in next higher grade). Here lapsed time is the same for both members of a pair, but the grade placement differs by one full grade.

Comparison 2.2: Scores reported for failed pupils for second year following failure (i.e., next higher grade) with scores reported for promoted matchees for this same grade. Here the grade placement is the same for both members of a pair, but lapsed time differs by one full year.

Comparison 2.3: Scores reported for failed pupils with scores reported for promoted matchees when both were in grade seven. Here, again, the grade placement is the same for both, but lapsed time differs by one year.

Comparison 2.4: Scores reported for failed pupils in grade seven with scores reported for promoted matchees in grade eight. Here lapsed time is the same for both members of a pair, but the grade placement differs by one full grade.

STATISTICAL ANALYSIS

A very brief account of the statistical procedures employed in analyzing the data for the various comparisons studied is presented in this section.

Both Type 1 comparisons (1.1 and 1.2) were analyzed by application of a *t*-test of the significance of the difference between means of related samples. Separate tests were applied for each of the criterion variables by grade in which failure occurred.

The analysis employed with the Type 2 comparisons in the case of the four content area test scores differed from that used in the case of the over-all composite score. It will be recalled that each failed pupil was paired with a promoted pupil solely on the basis of performance on the particular content area test under investigation. Regardless of whether the matching is internal or external, comparisons based upon it may be expected to be biased in favor of the promoted pupils, for while the two pupils may be perfectly matched with regard to the specific area in question, it is reasonable to expect that the promoted pupils will be superior in other areas and, therefore, less retarded in general.[5] To control as much as pos-

[5] Ideally, failed and promoted pupils should have been paired on the basis of test battery profiles. Unfortunately, such pairs are virtually nonexistent.

sible this factor of general or over-all retardation, the specific area test scores for the pairs of failed and promoted pupils were analyzed by the method of analysis of covariance with the over-all composite score being used as the statistical control variable. Separate analyses were made for each content area test by grade in which failure occurred. All Type 2 comparisons involving the area test scores were analyzed in this manner.

Variation in general or over-all retardation between members of a pair was not a matter of concern in the case of the Type 2 comparisons involving the over-all composite as a criterion since in such cases the individuals were matched on the basis of their over-all composite scores. Hence, all Type 2 comparisons involving the over-all composite scores were analyzed by application of the *t*-test for related samples.

RESULTS: TYPE 1 COMPARISONS

The findings with respect to both Type 1 comparisons are presented in Table I. The numbers of pupils involved at the different grade levels varied slightly from test to test as well as from the one to the two-year comparisons. However, the approximate numbers of pupils in the grade groups were fifty-five, forty, twenty-five, twenty and forty for grades three through seven, respectively. As has been indicated, the individual pupil scores were expressed in terms of a grade-equivalents scale. The numbers comprising such a scale are two digit numbers with the first digit (i.e., the digit in the ten's place) representing the grade level and the second digit representing the number of months spent in this grade. Thus a grade-equivalent score of 43 represents a performance corresponding to that of a typical pupil at the end of three months in grade four. Grade-equivalent scores ending in zero represent typical performance at the beginning of a school year, while those ending in nine represent typical performance at the close of a school year.

The figures in Column 1 of Table I are the means of grade-equivalent scores made on the various criterion tests by failed pupils. Separate means are reported for groups of pupils organized according to the grade failed. In each case, the means shown in this column are based on measurements taken during the year in which failure occurred. Columns 2 and 3 present corresponding means for the same pupils, except that they are based upon measurements taken one and two years later, respectively. The one-and two-year

TABLE I.—GAINS MADE BY FAILED PUPILS ONE AND TWO YEARS AFTER FAILURE

Grade Failed	Test	Means at Time of Failure (Col. 1)	Means 1 Year Later (Col. 2)	Means 2 Years Later (Col. 3)	1 Year Gains (Col. 4)	2 Year Gains (Col. 5)
3	Reading	29	32	37	3	8
	Study skills	32	34	40	2	8
	Language	27	32	39	5	12
	Arithmetic	31	34	39	3	8
	Over-all	30	33	39	3	9
4	Reading	32	36	45	4	13
	Study skills	34	41	48	7	14
	Language	33	40	47	7	14
	Arithmetic	35	40	50	5	15
	Over-all	34	39	48	5	14
5	Reading	42	50	55	8	13
	Study skills	43	50	60	7	17
	Language	41	50	55	9	14
	Arithmetic	43	52	61	9	18
	Over-all	42	50	58	8	16
6	Reading	48	54	60	6	12
	Study skills	48	58	64	10	14
	Language	48	56	61	8	13
	Arithmetic	54	61	68	7	14
	Over-all	50	58	63	8	13
7	Reading	55	62		7	
	Study skills	61	63		2	
	Language	54	62		8	
	Arithmetic	62	69		7	
	Over-all	58	64		6	

gains shown in Columns 4 and 5 are simply the differences between the means based on measurements obtained during the year in which failure occurred and the corresponding means based on measurements made one (comparison 1.1) and two (comparison 1.2) years later. In a logically loose and quantitatively approximate sense, these gains may be viewed as corresponding to school progress in months or in years and months according to whether they are one or two digit numbers.

Since the tests were typically administered in late January, the

expected or average scores for grades three through seven respectively are 35, 45, 55, 65, and 75. During the year of non-promotion, then, the pupils failing third grade were on the average for these tests only slightly more than one-half year retarded, while those failing the fourth and fifth grades were retarded by slightly more than a year, and those failing sixth and seventh grades by more than a year and a half.

After the lapse of one year, during which these pupils remained in the same grade, statistically significant mean gains were achieved by all groups on all measures save the sixth grade group in reading and the seventh grade group in work-study skills. Over all grades and tests these gains averaged about six months and ranged from two months for the grade three group in work-study skills to one year for the grade six group in this same content area. In no case, however, were the gains sufficient to bring the one year later means up to the grade norm. In other words, these pupils were still retarded, even after repetition of the same grade.

When the tests were administered to these groups after a lapse of two years (the pupils were then in the next higher grade), the gains averaged approximately one year and three months and ranged from eight months to one year and eight months. Again, however, the gains were insufficient to bring any of the groups up to the grade norm on any of the criterion variables studied.

A word of caution should be introduced lest the inference be drawn from Table I that gains tend to be greater for pupils experiencing failure in the upper elementary grades. This may or may not be true, but the data presented in Table I cannot validly be cited as evidence, since two distinct test batteries—an elementary and an advanced—are involved. While these batteries have been carefully equated, the fact remains that any differences in mean gains from grade level to grade level could possibly be due to differences in scale.

RESULTS: TYPE 2 COMPARISONS

The findings regarding comparisons 2.1 and 2.2 are summarized in Table II. The values shown in this table are in terms of the same type of unit or scale as the gains reported in Table I (Col. 4 and 5). Except in the case of the over-all values reported, they represent differences between means of the grade-equivalent scores of groups of matched failed and promoted pupils after an analysis of covari-

ance adjustment to control differences in general or over-all retardation, the original matching having been done on the basis of the particular test variable in question. No such adjustment was needed for the over-all criterion. These differences were all found by subtracting the means for the failed groups from those of the corresponding promoted groups so that positive differences are in favor of the promoted group. As was true of the Type 1 comparisons, the numbers of pupils at the various grade levels varied slightly from test to test as well as from comparison to comparison. However, the approximate numbers of pupils in the grade groups three

TABLE II.—ADJUSTED DIFFERENCES BETWEEN MEANS OF INTERNALLY AND EXTERNALLY MATCHED FAILED AND PROMOTED PUPILS ONE YEAR AFTER FAILURE AND WHEN BOTH ARE IN NEXT HIGHER GRADE

Grade Failed	Test	Adj. Mean Diff.* after 1 Yr.		Adj. Mean. Diff.* at Next Grade	
		Internal Grp.	External Grp.	Internal Grp.	External Grp.
3	Reading	9†	3	5†	−2
	Study skills	4†	4	−2†	−4
	Language	6†	4	−1	−5
	Arithmetic	5†	6†	1	−1
	Over-all‡	6†	5†	1	−3
4	Reading	6	10†	−1	2
	Study skills	6†	2	−1	−8†
	Language	6†	11†	−3	−1
	Arithmetic	0	5†	−5†	−8†
	Over-all‡	3	6†	−3	−6†
5	Reading	9	0	6	−4
	Study skills	4	5	−9†	−7
	Language	8	3	−2	−5
	Arithmetic	3	6	−3	−7
	Over-all‡	3	3	−4	−6†
6	Reading	12	−3	−5	−6
	Study skills	9	4	4	−1
	Language	−2	7†	−3	2
	Arithmetic	6	4†	−1	0
	Over-all‡	9	2	0	−4

* Positive differences favor promoted groups.

† Difference statistically significant beyond five per cent level.

‡ Not adjusted by analysis of covariance.

through six were forty, twenty, eighteen, and seven, respectively, for the internally matched pairs, and fifteen, fifteen, six, and fifteen for the externally matched pairs.

The first two columns of differences were based on measures taken one year after the failures were imposed (comparison 2.1), that is, after both groups had experienced an additional year of schooling during which the failed pupils remained in the same grade and the promoted pupils advanced to the next higher grade. Regardless of type of matching (internal or external) these differences tended to favor the promoted pupils, though statistical significance obtained in only about one-third of the situations. Considering all comparisons, these differences averaged about six months in the case of the internally matched pairs and about four months in the case of the externally matched pairs.

The last two columns of differences in Table II were based on measures taken when both groups were in the next higher grade (comparison 2.2), that is, after the failed group had experienced two additional years of schooling as compared with one for the promoted group. As would be expected, these differences tend to favor the failed group. Even so, relatively few of them (less than one-fifth) proved to be statistically significant. Considering all comparisons, these differences averaged only about one month in the case of the internally matched pairs and about three months in the case of the externally matched pairs.

The findings regarding comparisons 2.3 and 2.4 are summarized in Table III. The design of this table and the character of the values reported in it are like those of Table II. The first two columns of differences were based on measures taken when both groups were in grade seven (comparison 2.3), that is, had reached or were near the end of their elementary schooling, depending upon the type of school organization in effect. It is important to recognize that in this comparison the failed groups involved have spent one more year in school than the promoted groups. Only three significant differences were found and these favored the promoted group. Considered as a whole, the differences observed are virtually negligible regardless of whether the matching is internal or external. These differences average only two months in the case of the internally matched group and zero months in the case of the externally matched groups. Thus, the evidence indicates that the additional year spent in school by the failed pupils had not by the close

TABLE III.—ADJUSTED DIFFERENCES BETWEEN MEANS OF INTERNALLY AND EXTERNALLY MATCHED FAILED AND PROMOTED PUPILS WHEN BOTH ARE IN GRADE SEVEN AND WHEN THE FAILED PUPILS ARE IN GRADE SEVEN AND THE PROMOTED PUPILS IN GRADE EIGHT

Grade Failed	Test	Adj. Mean Diff.* in Grade 7		Adj. Mean Diff.* in Grades 7 vs. 8	
		Internal Grp.	External Grp.	Internal Grp.	External Grp.
3	Reading	8	−10	19†	5
	Study skills	10†	9	15†	16
	Language	9†	0	14†	10
	Arithmetic	1	1	8†	8
	Over-all‡	5†	−1	13†	8
4	Reading	2	10	8	18†
	Study skills	9	−3	6	5
	Language	4	4	7†	13†
	Arithmetic	−2	0	3	6
	Over-all‡	0	1	5	10†
5	Reading	−1	2	0	18†
	Study skills	1	3	5	9
	Language	−1	−5	4	14
	Arithmetic	2	−1	11†	8
	Over-all‡	−3	−3	0	10
6	Reading	−5	−6	5	3
	Study skills	4	−1	14	2
	Language	−3	2	8	3
	Arithmetic	−1	0	8	2
	Over-all‡	0	−4	9	0

* Positive differences favor promoted groups.
† Difference statistically significant beyond five per cent level.
‡ Not adjusted by analysis of covariance.

of their elementary school training enabled them to surpass in achievement their regularly promoted counterparts.

The differences reported in the last two columns of Table III were based on pupil performances measured when the failed groups were in grade seven and the promoted groups in grade eight (comparison 2.4), that is, when the number of years spent in school since failure was the same for both groups. In this case, regardless of whether matching is internal or external, all differences favored the promoted pupils. However, only about one-fourth of these dif-

ferences were found to be statistically significant. Considering all comparisons, these differences averaged close to a school year (eight months) for both internally and externally matched groups.

RESULTS: SUBSIDIARY PROBLEMS

As by-products of the data collected for this study it was possible to investigate four subsidiary problems.

The first of these had to do with the effect of the grade level at which failure occurred. Using only the five criterion scores obtained for the failed pupils when they were in seventh grade, analyses of variance were effected to test the hypothesis that the level of seventh grade achievement was the same for a group experiencing failure in one grade as for a group experiencing failure in any other grade. The evidence did not indicate any basis for the rejection of this hypothesis.

The second subsidiary problem had to do with the effect of promotion policy upon the general level of school achievement. Using as an index of rigidity or leniency of promotion policy the ratio of the number of pupil years of failure for the pupils enrolled in grade seven to the total number of pupils enrolled in that grade, two extreme groups of schools were identified, one a rigid group and the other a lenient group in terms of promotion policy. No school for which this index value fell below 0.2 was included in the rigid group. The mean value of this index for the twenty-five schools classified in this group was 0.3. The twenty-eight schools classified as lenient in promotion policy all had index values of zero. Using the mean score on the over-all composite for all students in each seventh grade class as a criterion of the level of achievement for a school, a simple *t*-test was applied to determine whether or not the criterion means differed significantly for these two types of schools. While the difference obtained favored slightly the schools having a lenient promotion policy, it was not statistically significant.

The third subsidiary problem had to do with the effect of promotion policy upon variability of pupil achievement. The two groups of schools used in connection with the foregoing problem were again employed. The standard deviation of the over-all composite scores for all pupils in each seventh grade class was used as a criterion of pupil variability within a given school. The means of these standard deviations were almost identical for the two types of schools.

The final subsidiary problem had to do with the effect of promo-

tion policy upon overageness. The two groups of schools used in the preceding two problems were again employed. The per cent of overage seventh grade pupils was used as a criterion of the extent of overageness prevalent in a given school. The means of these per cents for the rigid and lenient promotion policy schools were 17.3 and 6.4 per cent, respectively. The difference (10.9 per cent) between these means was statistically significant.

SUMMARY OF FINDINGS

The findings based on all comparisons as well as the subsidiary problems are summarized below. As is usually true of attempts to summarize complex results, there is considerable oversimplification. Special caution should be exercised with respect to generalizing from reported typical gains expressed in units of months. At least, it should be recognized that these units arise from a particular grade-equivalent scale associated with a particular test battery applied to a sample of children from a particular population.

(1) Failed pupils typically gain approximately only six months in educational progress during the repeat year and still fail to achieve the norm for the grade involved.

(2) Failed pupils typically gain approximately one year and three months in educational progress during the two years following failure and still fail to achieve the norm for the grade involved.

(3) During the year following failure, the educational progress of failed pupils is typically about four to six months less than that of matching promoted pupils.

(4) The educational progress of failed pupils during the two years following failure is not significantly greater (perhaps of the order of one to three months) than that made by promoted matchees during the single year spent in the next higher grade.

(5) The educational progress of seventh grade pupils who have experienced failure once is typically on a par with that of matched promoted seventh grade pupils who have spent one year less in school.

(6) The educational progress of seventh grade pupils who have experienced failure once is typically eight months less than that of matched promoted eighth grade pupils who have spent the same number of years in school.

(7) The educational progress of seventh grade pupils who have

experienced failure once is typically not affected by the grade in which the failure was experienced.

(8) The general level of achievement of a school's seventh grade class is not significantly affected by the rigidity or leniency of its promotion policy.

(9) The variability of pupil achievement in a school's seventh grade class is not affected by the rigidity or leniency of its promotion policy.

(10) The per cent of overage seventh grade pupils is significantly greater (perhaps of the order of ten per cent) in the case of schools having rigid promotion policies than in the case of schools having lenient promotion policies.

CONCLUDING REMARKS

Failure, in the form of non-promotion, as a device to ensure greater mastery of elementary school subject matter does appear justifiable in the light of the findings of this investigation. From the results reported, it would seem that slow learning children who are required to repeat a grade and slow learning children who are promoted, ultimately perform at about the same level when this performance is measured in the same higher grade, in spite of the fact that the failed pupils have each spent an added year in attaining this higher grade. It is not the intent to imply that a child should never be failed as he progresses through elementary school. However, if the consideration is solely a matter of educational achievement, it does seem clear that little is gained by requiring the repetition of a grade.

It should, of course, be clearly recognized that many other variables not studied in this investigation enter into the problem of non-promotion. Among these are personal and social adjustment or maturity, chronological age, and physical maturity. Also, the possible increase in cost of instruction accompanying a rigid promotion policy together with the needed adaptation of curricular offerings are factors which cannot be ignored in the determination of a policy. The problem is far from simple. It would seem that the critics referred to at the outset of this paper would, at least, be well advised to proceed with somewhat more of the caution and care that is characteristic of the type of scholarship they claim to represent.

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BOOK REVIEWS

ERNST W. SWANSON AND JOHN A. GRIFFEN, Editors. *Public Education in the South Today and Tomorrow.* Chapel Hill: The University of North Carolina Press, 1955, pp. 137.

In 1953 Harry S. Ashmore undertook to direct a study of biracial education in the United States. As a result there was published *The Negro and the Schools.* The present volume is an extension and refinement of the voluminous data gathered for that study. All this research and these publications were supported by the Fund for the Advancement of Education. Contribution to the original study and to this volume was made by a very considerable number of research workers and assistants. The result is "a handbook on statistics related to the South's educational problems."

The introductory chapter gives a brief summary of the findings. Chapters 2–5 consider the people of the South—population, growth and movement of the population; the children of the South—school-age population and attendance; some qualitative measures of southern schooling; and what the South is spending for schooling. Chapters 6–9 deal with the projection of school-age population, enrollment and daily attendance; the price of equality and improvement; the projection of southern income; and the South's ability to pay. Ten appendices explain techniques of the research, dealing with the selection of the sample, methods of projection of enrollment, of capital deficit, of income projection, etc.

The investigation assumes that, apart from integration, education of the South is faced with four major problems: equalization of current expenditures; modern housing; improvement of instruction; more classrooms and teachers. Comparisons are made between the South and the non-South, the South being defined for this study as the States of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia.

The authors clearly indicate that educational problems cannot be wholly determined in quantitative terms and point to qualitative differences that need to be considered. A dollar spent in one city or state cannot be considered as being of equal educational value as a dollar spent in some other city or state. However, careful statistical results permit insights that could not be had accurately without them.

The progress in education made in the South is heartening; the conclusion suggested in this study is that what needs to be done now and in the future is possible. No position is taken as regards integration; the measurements of deficits and projected expenditures have been figured in terms of the present dual system. It is thought that costs for the individual states would be "approximately the same, whether accomplished within a system of segregation, integration, or a combination of the two." But the people interested should see this most expensive function in its entirety and with as much accuracy as possible.

This book gives an over-all view with as much precision as may be expected in this complicated field of investigation. It is a handbook and should be a required book for those who are trying to solve the problems of schools and education of the South.

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CECIL V. MILLARD. *School and Child: A Case History*. East Lansing: Michigan State College Press, 1954, pp. 221. $3.75.

In the author's own words this book has three objectives: (1) it "attempts to bring added light to the knowledge of development sequences of the preadolescent." (2) it "attempts to refine many of the broad principles and generalizations as to how the elementary school child grows and develops . . ." and (3) it illustrates "with one single case principle and generalization of the child's growth and development." These three objectives have been achieved with appreciable success.

Studies in human development have relatively neglected the school-age child from six to eleven—at least more attention has been devoted to the infant, preschool, and adolescent periods. For a number of years longitudinal studies have been made on school children by the Child Development Laboratory of Michigan State University under the author's direction. Data secured on seventy children who were available for the full period included measures of physical growth, mental development, achievement in school subjects, general development from the Courtis Motor and General Development Tests, and social status changes. In addition an annual case inventory was prepared from the formal data as well as from reports of student observers of children, home study, child's work samples, and interviews with the child.

The major portion of the present book is devoted to the study of Patricia as a continuing example of growth, about whom general principles are discussed. Six chapters of Part 1 describe the "mode" of each of the first six grades and detail the behavior of the illustrative case. Part 2 analyzes the changes in physical and mental development, academic achievement, personal-social development, and personal adjustment of Patricia. In the two chapters of Part 3, data presented earlier are used in an analysis of developmental patterns and the problems of studying child development.

For the reader, Patricia remains a real, normal girl who grows and in growing shows changing behavior in her school society. Tables of data and curves of growth help to condense material but the interrelations of all the variables of growth are seen most clearly in the picture drawn of the illustrative case for each grade, and then from the point of view of the several developmental areas. In over-all view the data lead to a picture of cyclic development with patterns showing changes at about seven years, ten years, and at the start of adolescence.

While essentially monographic in nature this book is written in a style that would make it an acceptable textbook or supplementary text in courses in child development. In particular it is valuable for the future teacher who can profit so greatly from an adequate understanding of the development of the average child.

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